

Math 70

Week 4

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1 Problems

Example 1.1. (1.1 – 16 in PSI) Let p_n , $n = 0, 1, 2, \dots$ be the probability that an automobile policyholder will file for n claims in a five-year period. The actuary involved makes the assumption that $p_{n+1} = (1/4)p_n$. What is the probability that the holder will file two or more claims during this period?

Example 1.2. You pick two real numbers uniformly at random between $(0, 10)$. What is the probability that the difference is less than 1.

Example 1.3. (PSI 1.2.5) How many four-letter code words are possible using the letters in IOWA if

1. The letters may not be repeated?

(A)12 (B)24 (C)48 (D)256 (E)*None*

2. The letters may be repeated?

(A)12 (B)24 (C)48 (D)256 (E)*None*

Example 1.4. (PSI 1.2.5-modified) How many code words up to 5 letters are possible using the letters in IOWA if

1. The letters may not be repeated?

(A)24 (B)48 (C)64 (D)256 (E)*None*

2. The letters may be repeated?

(A)1024 (B)1228 (C)1364 (D)2048 (E)*None*

Solution

Example 1.5. How many 8 letter words we can create (meaningful or not) using the letters of

”LAGALAXY”?

(A)8! (B) $\frac{8!}{2}$ (C) $\frac{8!}{4}$ (D) $\frac{8!}{6}$ (E) $\frac{8!}{12}$

Example 1.6. You throw a fair coin consequently. What is the probability that HH appears before TT?

Example 1.7. Let $X \sim \text{Geo}(p)$. Compute $E(e^{tX})$.

Example 1.8. A *round-robin* tournament is being held with n tennis players; this means that every player will play against every other player exactly once.

1. How many games are played in total?
2. How many possible outcomes are there for the tournament (the outcome lists out who won and who lost for each game)?

Solution